

**BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2019-1-E

In the Matter of)	DIRECT TESTIMONY
Annual Review of Base Rates)	OF JULIE K. TURNER FOR
for Fuel Costs for)	DUKE ENERGY PROGRESS, LLC
Duke Energy Progress, LLC)	

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Julie K. Turner and my business address is 411 Fayetteville Street,
3 Raleigh, North Carolina.

4 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

5 A. I am Vice President of Carolinas Natural Gas Generation for Duke Energy Progress,
6 LLC ("DEP" or the "Company").

7 **Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND**
8 **PROFESSIONAL BACKGROUND.**

9 A. I graduated from North Carolina State University with a Bachelor of Science degree
10 in Mechanical Engineering and received a Masters degree in Business
11 Administration from the University of Colorado. My career began with Duke
12 Energy (d/b/a Carolina Power & Light) in 1991 as a staff engineer at DEP's Harris
13 Nuclear Station. Since that time, I have held various roles of increasing
14 responsibility in the generation engineering, maintenance, and operations areas,
15 including the role of Station Manager, first at DEP's Lee Energy Complex, followed
16 by leading six DEP natural gas generating stations. I assumed my current role in
17 2016.

18 **Q. WHAT ARE YOUR DUTIES AS VICE PRESIDENT OF CAROLINAS**
19 **NATURAL GAS GENERATION?**

20 A. In this role, I am responsible for providing safe, reliable and event-free operations of
21 Duke Energy's fleet of natural gas generation facilities in South Carolina and North
22 Carolina, totaling over 10,000 megawatts ("MWs"). My responsibilities include

1 operating and maintaining the fleet within design parameters and implementing safe
2 work practices and procedures to ensure the safety of our employees.

3 **Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION IN ANY PRIOR**
4 **PROCEEDINGS?**

5 A. Yes, I testified in DEP's base rate proceeding in Docket No. 2018-318-E.

6 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
7 **PROCEEDING?**

8 A. The purpose of my testimony is to (1) describe DEP's Fossil/Hydro/Solar generation
9 portfolio and changes made since the 2018 fuel cost recovery proceeding, as well as
10 those expected in the near term, (2) discuss the performance of DEP's
11 Fossil/Hydro/Solar facilities during the period of March 1, 2018 through February
12 28, 2019 (the "review period"), (3) provide information on significant
13 Fossil/Hydro/Solar outages that occurred during the review period, and (4) provide
14 information concerning environmental compliance efforts.

15 **Q. PLEASE DESCRIBE DEP'S FOSSIL/HYDRO/SOLAR GENERATION**
16 **PORTFOLIO.**

17 A. The Company's Fossil/Hydro/Solar generation portfolio consists of 9,204 MWs of
18 generating capacity, made up as follows:

19	Coal-fired -	3,544 MWs
20	Combustion Turbines -	2,816 MWs
21	Combined Cycle Turbines -	2,568 MWs
22	Hydro -	227 MWs

1 The Company's hydro fleet consists of 15 units providing 227 MWs of capacity.
2 The Company's solar fleet consists of four sites providing 49 MWs of dependable
3 capacity.

4 **Q. WHAT NOTABLE CHANGES HAVE OCCURRED WITHIN THE**
5 **FOSSIL/HYDRO/SOLAR PORTFOLIO SINCE DEP'S 2018 ANNUAL FUEL**
6 **PROCEEDING?**

7 A. Darlington CT Unit 5 retired in May 2018, which reduced capacity by 51 MWs.

8 **Q. WHAT ARE DEP'S OBJECTIVES IN THE OPERATION OF ITS**
9 **FOSSIL/HYDRO/SOLAR FACILITIES?**

10 A. The primary objective of DEP's Fossil/Hydro/Solar generation department is to
11 provide safe, reliable and cost-effective electricity to DEP's customers. Operations
12 personnel and other station employees are well-trained and execute their
13 responsibilities to the highest standards in accordance with procedures, guidelines,
14 and a standard operating model. Like safety, environmental compliance is a "first
15 principle," and DEP works very hard to achieve high level results.

16 The Company achieves compliance with all applicable environmental
17 regulations and maintains station equipment and systems in a cost-effective manner
18 to ensure reliability. The Company also takes action in a timely manner to
19 implement work plans and projects that enhance the safety and performance of
20 systems, equipment, and personnel, consistent with providing low-cost power
21 options for DEP's customers. Equipment inspection and maintenance outages are
22 generally scheduled during the spring and fall months when customer demand is
23 reduced due to milder temperatures. These outages are well-planned and executed

1 with the primary purpose of preparing the unit for reliable operation until the next
2 planned outage.

3 **Q. HOW MUCH GENERATION DID EACH TYPE OF GENERATING**
4 **FACILITY PROVIDE FOR THE REVIEW PERIOD?**

5 A. For the review period, DEP's total system generation was 60,318,765 megawatt-
6 hours ("MWHs"), of which 32,515,841 MWHs, or approximately 54%, was
7 provided by the Fossil/Hydro/Solar fleet. The breakdown includes a 39%
8 contribution from gas facilities, 13% contribution from coal-fired stations, 1.4%
9 contribution from hydro facilities, and 0.4% from solar facilities.

10 The Company's portfolio includes a diverse mix of units that, along with its
11 nuclear capacity, allows DEP to meet the dynamics of customer load requirements in
12 a logical and cost-effective manner. Additionally, DEP has utilized the Joint
13 Dispatch Agreement with Duke Energy Carolinas, LLC ("DEC"), which allows
14 generating resources for DEP and DEC to be dispatched as a single system to
15 enhance dispatching at the lowest possible cost. The cost and operational
16 characteristics of each unit generally determine the type of customer load situation
17 (e.g., base and peak load requirements) that a unit would be called upon or
18 dispatched to support.

19 **Q. HOW DID DEP COST EFFECTIVELY DISPATCH THE DIVERSE MIX OF**
20 **GENERATING UNITS DURING THE REVIEW PERIOD?**

21 A. The Company, like other utilities across the U.S., has experienced a change in the
22 dispatch order for each type of generating facility due to continued favorable
23 economics resulting from the lower pricing of natural gas. Further, the addition of

1 new CC units within DEP's portfolio in recent years has provided DEP with
2 additional natural gas resources that feature state-of-the-art technology for increased
3 efficiency and significantly reduced emissions. These factors promote the use of
4 natural gas and provide real benefits in cost of fuel and reduced emissions for
5 customers. Gas fired facilities provided 72% of the DEP Fossil/Hydro/Solar
6 generation during the review period.

7 **Q. WHAT WAS THE HEAT RATE FOR DEP'S COAL-FIRED AND**
8 **COMBINED CYCLE UNITS DURING THE REVIEW PERIOD?**

9 A. Heat rate is a measure of the amount of thermal energy needed to generate a given
10 amount of electric energy and is expressed as British thermal units ("Btu") per
11 kilowatt-hour ("kWh"). A low heat rate indicates an efficient fleet that uses less heat
12 energy from fuel to generate electrical energy. Over the review period, the
13 Company's seven coal units produced 24% of the Fossil/Hydro/Solar generation,
14 with the average heat rate for the coal-fired units being 11,342 Btu/kWh. The most
15 active station during this period was Roxboro, providing 68% of the coal production
16 for the fleet with a heat rate of 10,582 Btu/kWh. During the review period, the
17 Company's four combined cycle power blocks produced 59% of the
18 Fossil/Hydro/Solar generation, with an average heat rate of 7,165 Btu/kWh.

19 **Q. PLEASE DISCUSS THE OPERATIONAL RESULTS FOR DEP'S**
20 **FOSSIL/HYDRO/SOLAR FLEET DURING THE REVIEW PERIOD.**

21 A. The Company's generating units operated efficiently and reliably during the review
22 period. Several key measures are used to evaluate the operational performance
23 depending on the generator type: (1) equivalent availability factor ("EAF"), which

1 refers to the percent of a given time period a facility was available to operate at full
2 power, if needed (EAF is not affected by the manner in which the unit is dispatched
3 or by the system demands; it is impacted, however, by planned and unplanned
4 maintenance (*i.e.*, forced) outage time); (2) net capacity factor (“NCF”), which
5 measures the generation that a facility actually produces against the amount of
6 generation that theoretically could be produced in a given time period, based upon
7 its maximum dependable capacity (NCF *is* affected by the dispatch of the unit to
8 serve customer needs); (3) equivalent forced outage rate (“EFOR”), which
9 represents the percentage of unit failure (unplanned outage hours and equivalent
10 unplanned derated hours); a low EFOR represents fewer unplanned outage and
11 derated hours, which equates to a higher reliability measure; and, (4) starting
12 reliability (“SR”), which represents the percentage of successful starts.

13 The following chart provides operational results categorized by generator
14 type, as well as results from the most recently published North American Electric
15 Reliability Council (“NERC”) Generating Unit Statistical Brochure (“NERC
16 Brochure”) representing the period 2013 through 2017. The NERC data reported for
17 the coal-fired units represents an average of comparable units based on capacity
18 rating.

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<i>Generator Type</i>	<i>Measure</i>	<i>Review Period</i>	<i>2013-2017</i>	<i>Nbr of Units</i>
		<i>DEP Operational Results</i>	<i>NERC Average</i>	
<i>Coal-Fired Test Period</i>	EAFF	70.2%	81.6%	418
	NCF	25.3%	57.8%	
	EFOR	5.7%	8.0%	
<i>Coal-Fired Summer Peak</i>	EAFF	93.1%	n/a	n/a
<i>Total CC Average</i>	EAFF	80.8%	85.0%	338
	NCF	72.7%	52.7%	
	EFOR	4.73%	5.3%	
<i>Total CT Average</i>	EAFF	79.5%	87.8%	776
	SR	98.8%	98.1%	
<i>Hydro</i>	EAFF	81.8%	80.4%	1,113

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4 **Q. PLEASE DISCUSS SIGNIFICANT OUTAGES OCCURRING AT DEP'S**
5 **FOSSIL/HYDRO/SOLAR FACILITIES DURING THE REVIEW PERIOD.**

6 A. In general, planned maintenance outages for all fossil and hydro units are scheduled
7 for the spring and fall to maximize unit availability during periods of peak demand.
8 Most units had at least one short planned outage during this review period to inspect
9 and maintain plant equipment.

10 Roxboro Unit 4 had a planned outage in Spring 2018. The primary purpose
11 of the outage was to perform major boiler maintenance and precipitator
12 maintenance. Mayo Unit 1 had a planned outage in Fall 2018 to replace the
13 generator breaker and perform minor boiler maintenance. Roxboro Unit 2 had a
14 planned outage in Fall 2018. The primary purpose of the outage was to replace
15 burners, perform MATS inspection, and tie-in the dry bottom ash system.

1 The CC fleet performed planned outages at Richmond County CC PB5 and
2 Sutton CC in Spring 2018. The primary purposes of the Richmond CC PB5 outage
3 w to perform borescope inspections on the combustion turbines and steam turbine,
4 perform a Heat Recovery Steam Generator ("HRSG") inspection, and balance of
5 plant equipment maintenance. The primary purpose of the Sutton CC outage was to
6 perform a hot gas path inspection of the combustion turbines.

7 The CT fleet performed planned outages in Spring and Fall 2018. In Spring
8 2018, Smith CT Unit 1 and Unit 2 had planned outages. The primary purpose of the
9 Smith CT Unit 1 outage was to replace the existing exhaust stack. The primary
10 purpose of the Smith CT Unit 2 outage was to rewind the generator rotor, perform a
11 hot gas path inspection, and replace the existing exhaust stack. In Fall 2018,
12 Asheville CT Unit 3 and Unit 4 had a planned outage to perform transmission work
13 in the switchyard for the new Asheville CC plant and to perform balance of plant
14 maintenance.

15 **Q. HOW DOES DEP ENSURE EMISSIONS REDUCTIONS FOR**
16 **ENVIRONMENTAL COMPLIANCE?**

17 A. The Company has installed pollution control equipment on coal-fired units, as well
18 as new generation resources, in order to meet various current federal, state, and local
19 reduction requirements for NO_x and SO₂ emissions. The SCR technology that DEP
20 currently operates on the coal-fired units uses ammonia or urea for NO_x removal and
21 the scrubber technology employed uses crushed limestone or lime for SO₂ removal.
22 SCR equipment is also an integral part of the design of the newer CC facilities in
23 which aqueous ammonia (19% solution of NH₃) is introduced for NO_x removal.

1 Overall, the type and quantity of chemicals used to reduce emissions at the
2 plants varies depending on the generation output of the unit, the chemical
3 constituents in the fuel burned, and/or the level of emissions reduction required. The
4 Company is managing the impacts, favorable or unfavorable, as a result of changes
5 to the fuel mix and/or changes in coal burn and utilization of non-traditional coals.
6 Overall, the goal is to effectively comply with emissions regulations and provide the
7 optimal total-cost solution for operation of the unit. The Company will continue to
8 leverage new technologies and chemicals to meet both present and future state and
9 federal emissions requirements including the Mercury and Air Toxics Standards
10 (“MATS”) rule. MATS chemicals that DEP may use in the future to reduce
11 emissions include, but may not be limited to, activated carbon, mercury oxidation
12 chemicals, and mercury re-emission prevention chemicals. Company witness
13 Harrington provides the cost information for DEP’s chemical use and forecast.

14 **Q. DOES THAT CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

15 **A.** Yes, it does.